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An open approach for heterogeneous ISR systems inter-operability

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SINOVIA

▶ An innovative company

  ▶ a great R&D experience around the intelligent control

▶ Our business

  ▶ Inter-operability and control of heterogeneous infrastructures

▶ Our technology « Plug & Net »

  ▶ a hardware and software modular approach
  ▶ a validated technology in hard environments

Off-shore, nuclear,
Fire security, avionics,
Industrial process,
embedded systems
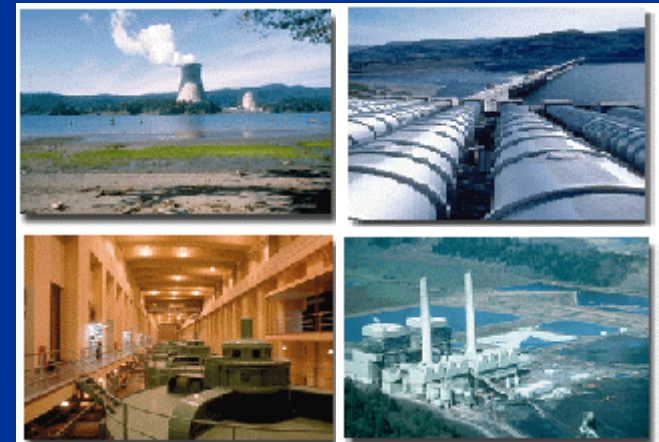
Inter-operability and intelligent control

«As we look at the trends in hardware, software, communications and other base technologies in control systems, a clear picture of an Open Control System (OCS) begins to emerge. Users will choose best-of-breed application modules, again vendor-independent but interoperable, to build world-class control systems for competitive advantage.»

Dan Miklovic, **Gartner Group**

«When the landscape of data sources changes constantly — or sources are not precisely definable — no extract-and-load procedure can help. In this environment, extracting meaningful business information from raw business or technical data is a very inflexible and complex procedure.»

Elmar Husmann, **PricewaterhouseCoopers**

«The real impact of all this networking and smart [sensing and control] devices is that the amount of information coming up from the floor [into the enterprise] will increase by between 10 and 100 times.»

Eric Byres, British Columbia Institute of Technology

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Interoperability

▸ Why

  ▸ multiple heterogeneous systems

  ▸ the need of interactions between these systems

▸ At a language level

  ▸ A common syntaxe

  ▸ A common semantic

    ▾ it supposes minimum level of common fonctionalities

▸ At a fonctional level

  ▸ multiple distributed services

  ▸ services act together in order to reach a common goal

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Interoperability & Components

▶ A component is
  ▶ an autonomous entity
  ▶ with an interface
  ▶ able to interact each others
  ▶ reusable and configurable

▶ An application is
  ▶ a composition of components
  ▶ a combination of capacities (fonctional modules)
    ▾ the whole is more than the addition of the parts
    ▾ leads to complex behaviors

▶ Evolving toward new applications
  ▶ replacing components
  ▶ adding new components
  ▶ testing incrementally

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Plug & Net®

▶ Intelligent control solution for the new generation of inter-operable infrastructures:

  ▶ Diversity of equipment
  ▶ proximited intelligence
  ▶ distributed control systems
  ▶ intensive use of new network protocols

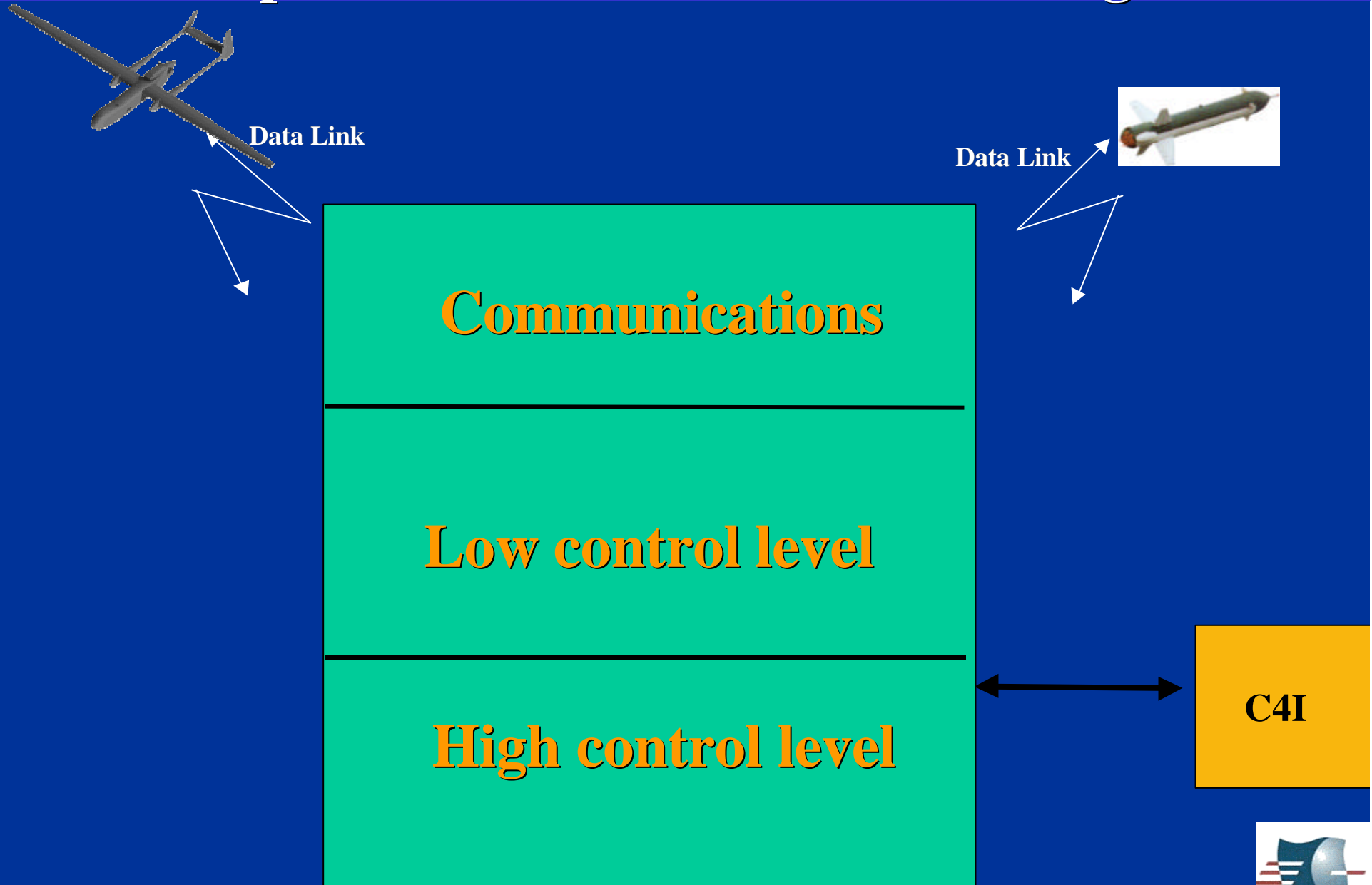*«The core technology of the future is the data communications network.»*

ARC Roadmaps the Future of Factory Automation, May 2001

Plug & Net

▸ Hardware and Software components

- ▸ Modular
- ▸ Distributed
- ▸ Configurable
- ▸ Adaptive
- ▸ Reusability

▸ Hardware

- ▸ Components for heterogeneous network interconnection
  - ▾ multi-protocols
  - ▾ real time

▸ Software

- ▸ an open framework for components integration based on a « plugging » technology

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Interoperable UAV SYSTEM with Plug & Net

Data Link

Data Link

Communications

Low control level

High control level

C4I

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UAV
Distributed Control & Interoperability

Communicating
From Anywhere to Everywhere with Anything

High control level
Data representation

Action planning

Man-machine interactions

Low control level
Data stream filtering

Local processing loops

Real time control

Plug & Net Concept

- **Adaptability**
  Modular agents

- **Scalability**
  Distributed agents

- **Simplicity**
  Plugging concept

Hardware

Agents

Software

Component

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Plug & Net Concept

Component Model
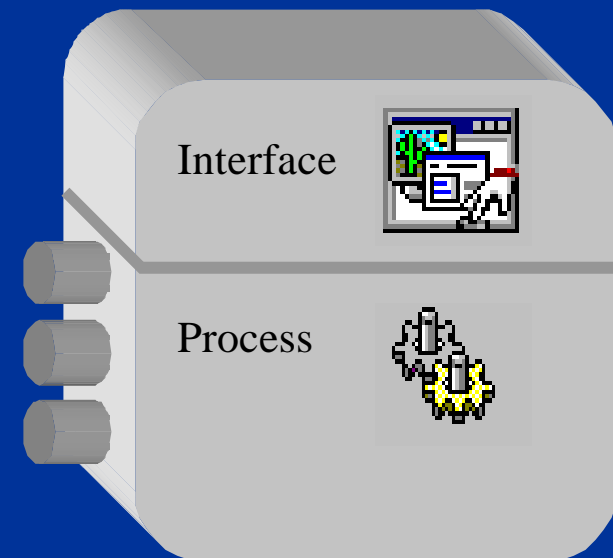
A Component is a Software Autonome Entity

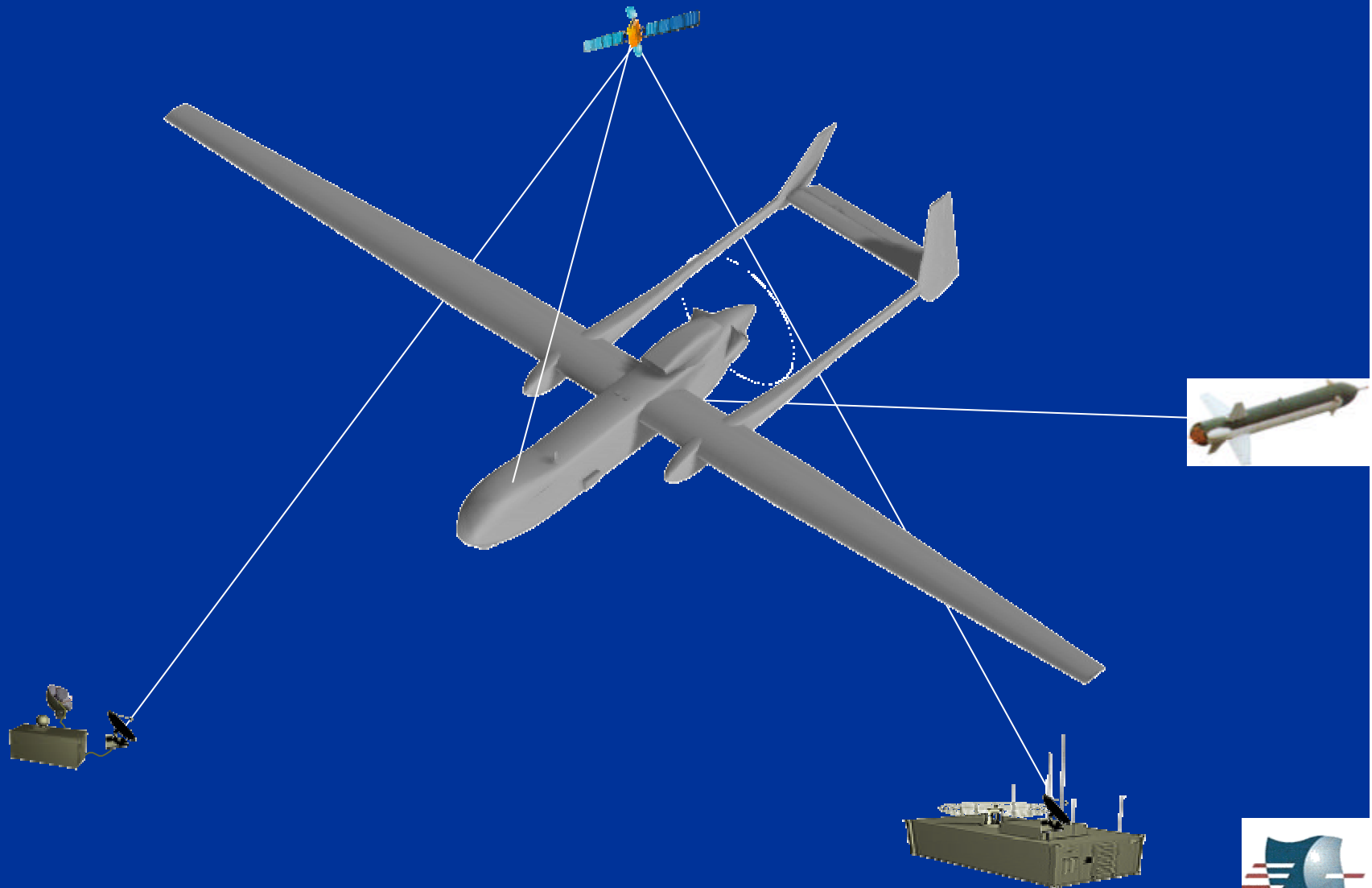A Component is composed by

An integration part (communications)
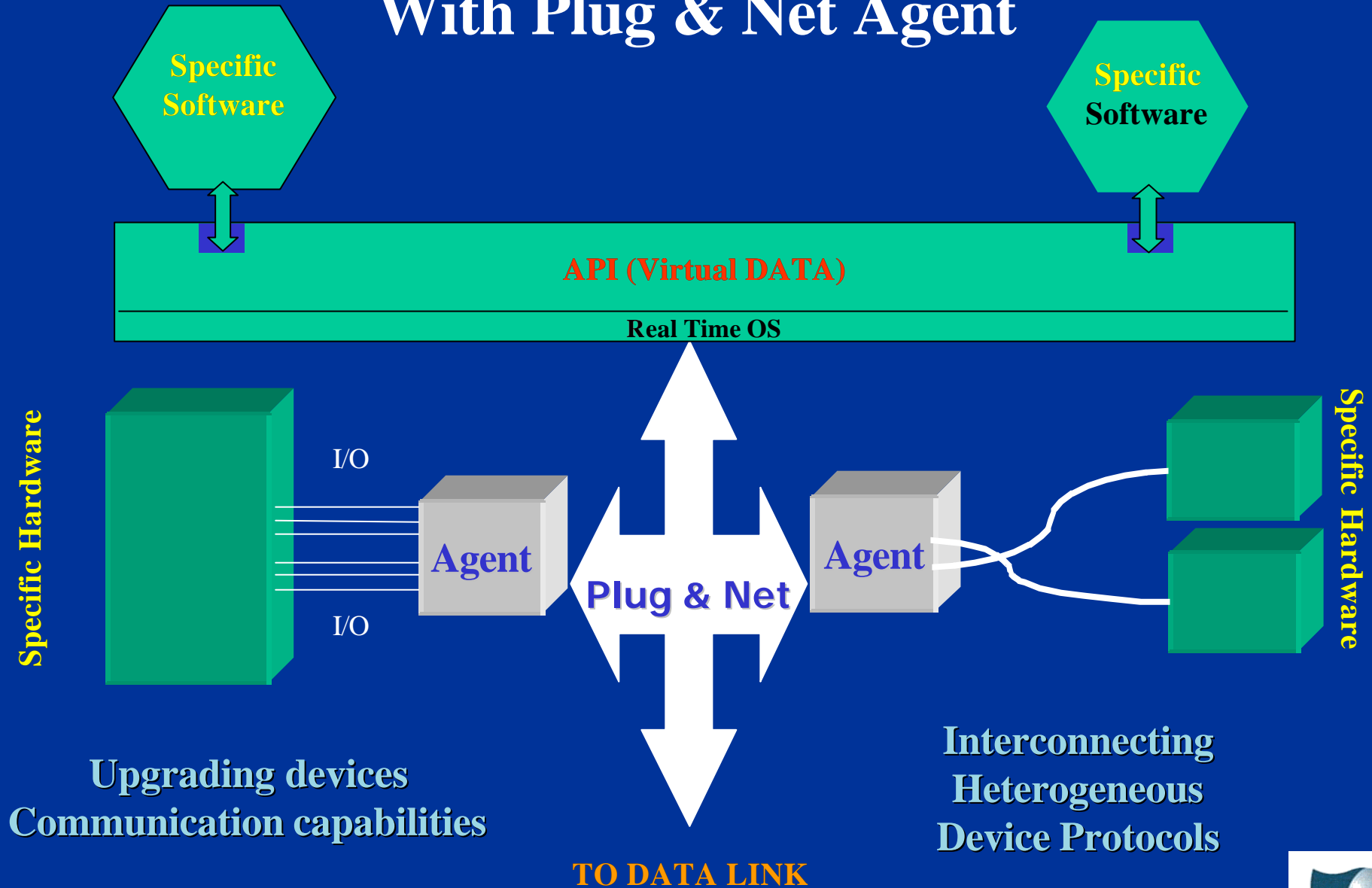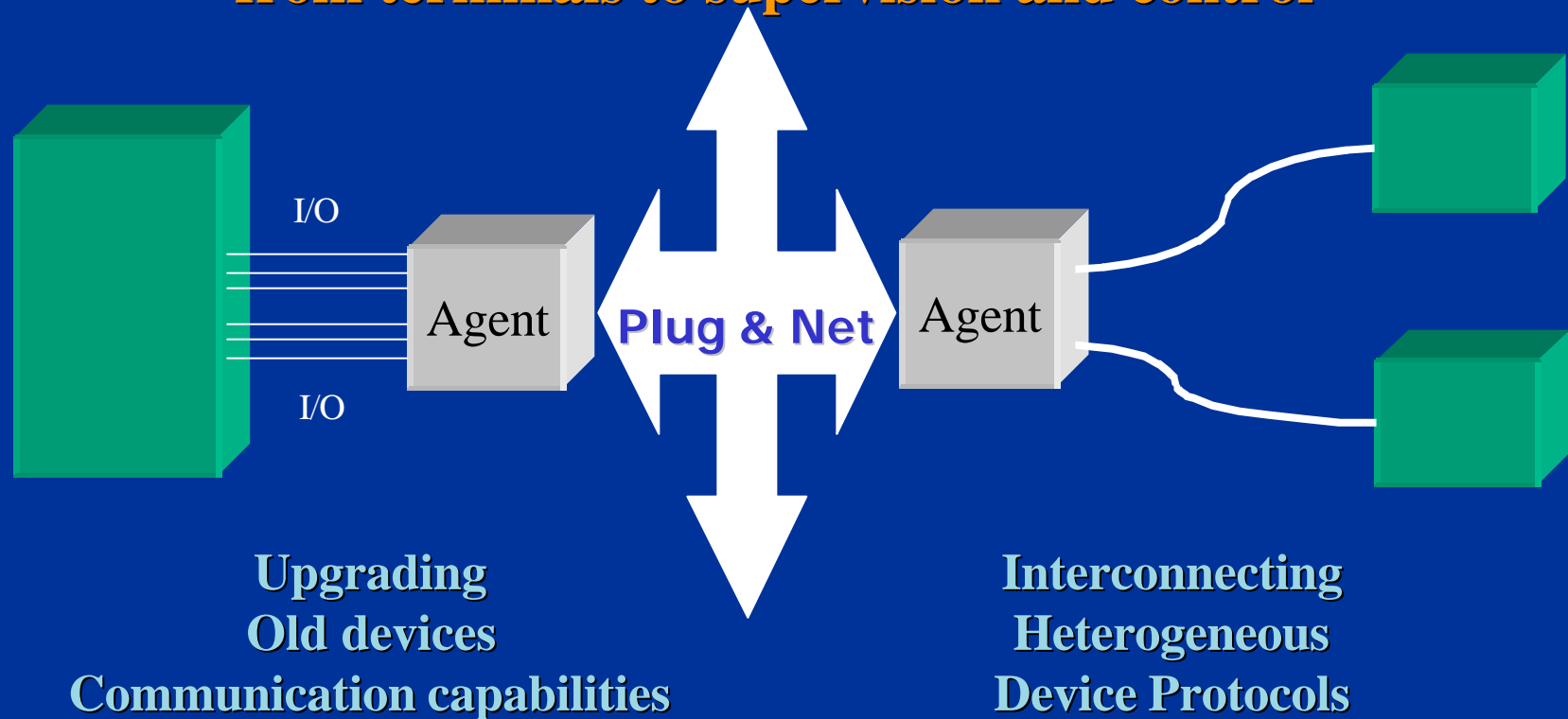A GUI (interface)
A fonctionality (process part)

Interface

Process

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Interoperable UAV SYSTEM
Embedded Architecture

Interoperable UAV SYSTEM
With Plug & Net Agent

Specific Software

Specific Software

API (Virtual DATA)

Real Time OS

Specific Hardware

I/O

I/O

Agent

Plug & Net

Agent

Specific Hardware

**Upgrading devices
Communication capabilities**

**Interconnecting
Heterogeneous
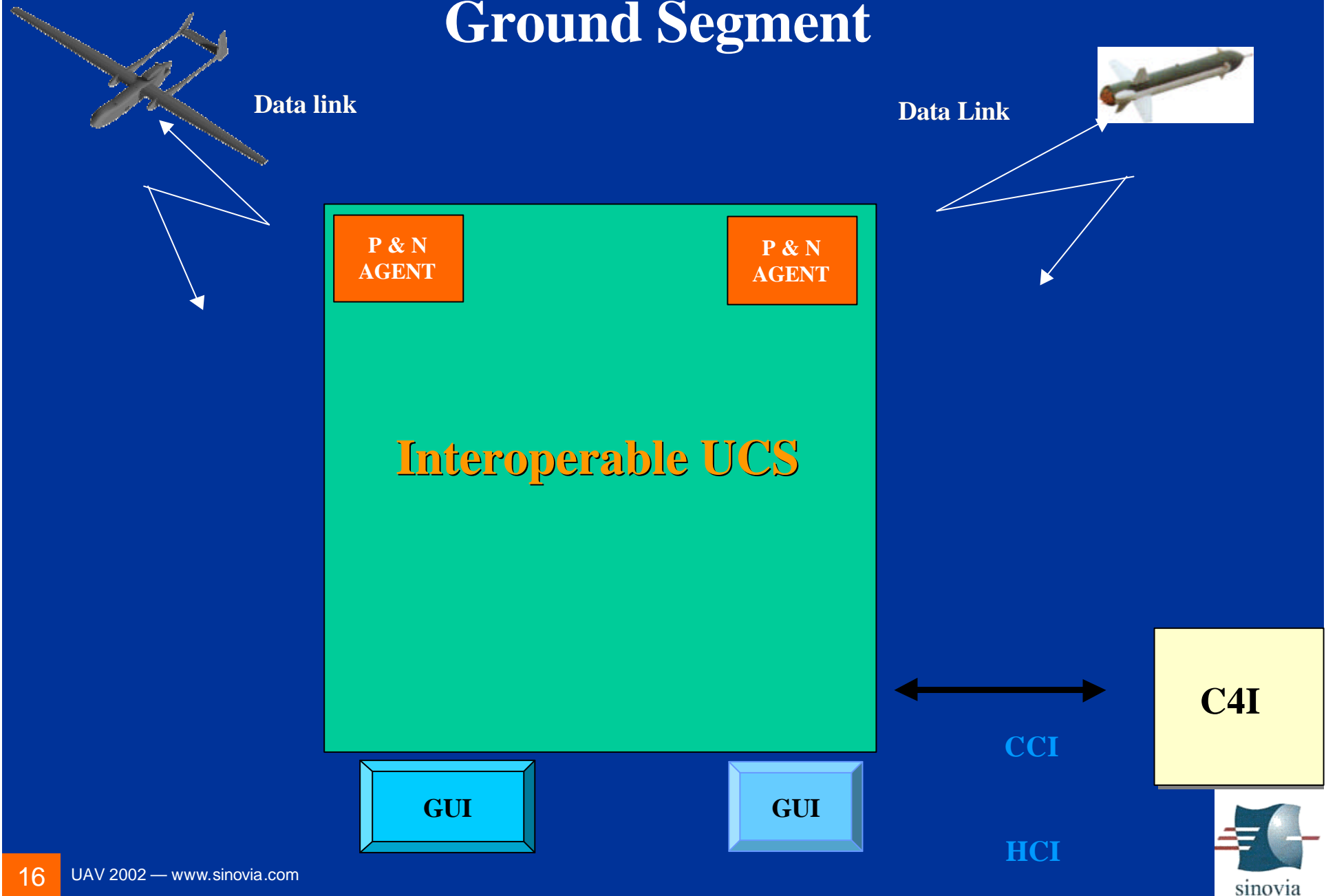Device Protocols**

TO DATA LINK

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Interoperable UAV SYSTEM
with Plug & Net Agent

**Distributed hardware agents to transport your
data over networks (field-bus, Ethernet, 1553, etc.)
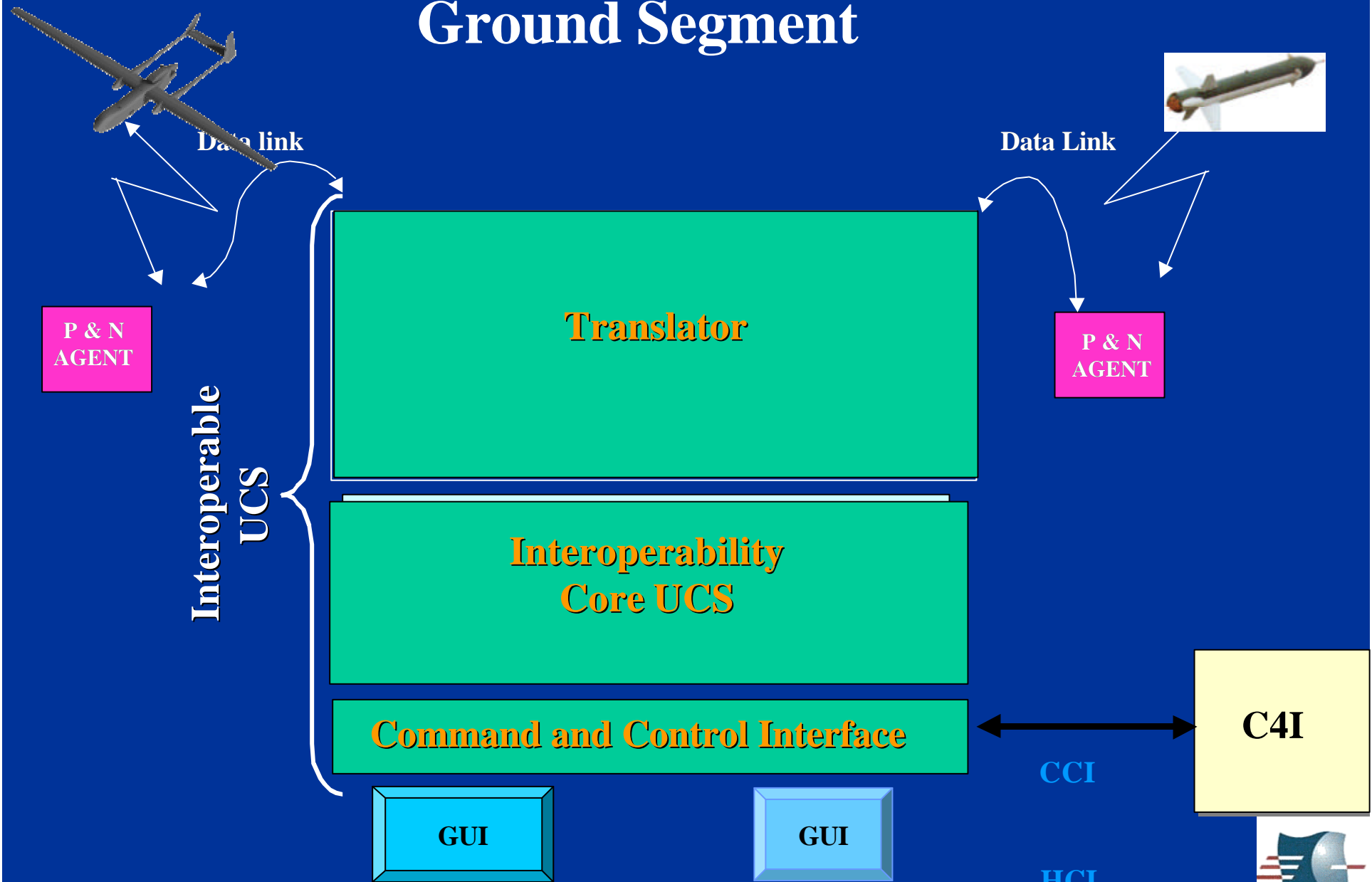from terminals to supervision and control**

I/O

I/O

Agent

Plug & Net

Agent

**Upgrading
Old devices
Communication capabilities**

**Interconnecting
Heterogeneous
Device Protocols**

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Interoperable UAV SYSTEM
Ground Segment

Data link

Data Link

P & N AGENT	**P & N AGENT**

Interoperable UCS

C4I

CCI

GUI

GUI

HCI

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Interoperable UAV SYSTEM
Ground Segment

Data link

Data Link

Interoperable UCS

Translator

P & N AGENT

P & N AGENT

Interoperability Core UCS

Command and Control Interface

C4I

CCI

GUI

GUI

HCI

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Interoperable UAV SYSTEM
Ground Segment

Data link

Data Link

Interconnecting Heterogeneous Device Protocols

Interconnecting Heterogeneous Device Protocols

DLI				DLI
API DRIVERS				**API DRIVERS**

P & N AGENT

P & N AGENT

TRANSLATOR

API DATA PLUGS

Heterogenous component container

Real Time Object OS

STANAG

Loop

Loop

DRIVERS

Command and Control Interface

C4I

CCI

GUI

GUI

HCI

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Translator & Data Plugs

Data
(Plugs)

Connection

Filter
(script)

- Data conversion
- Data adaptation
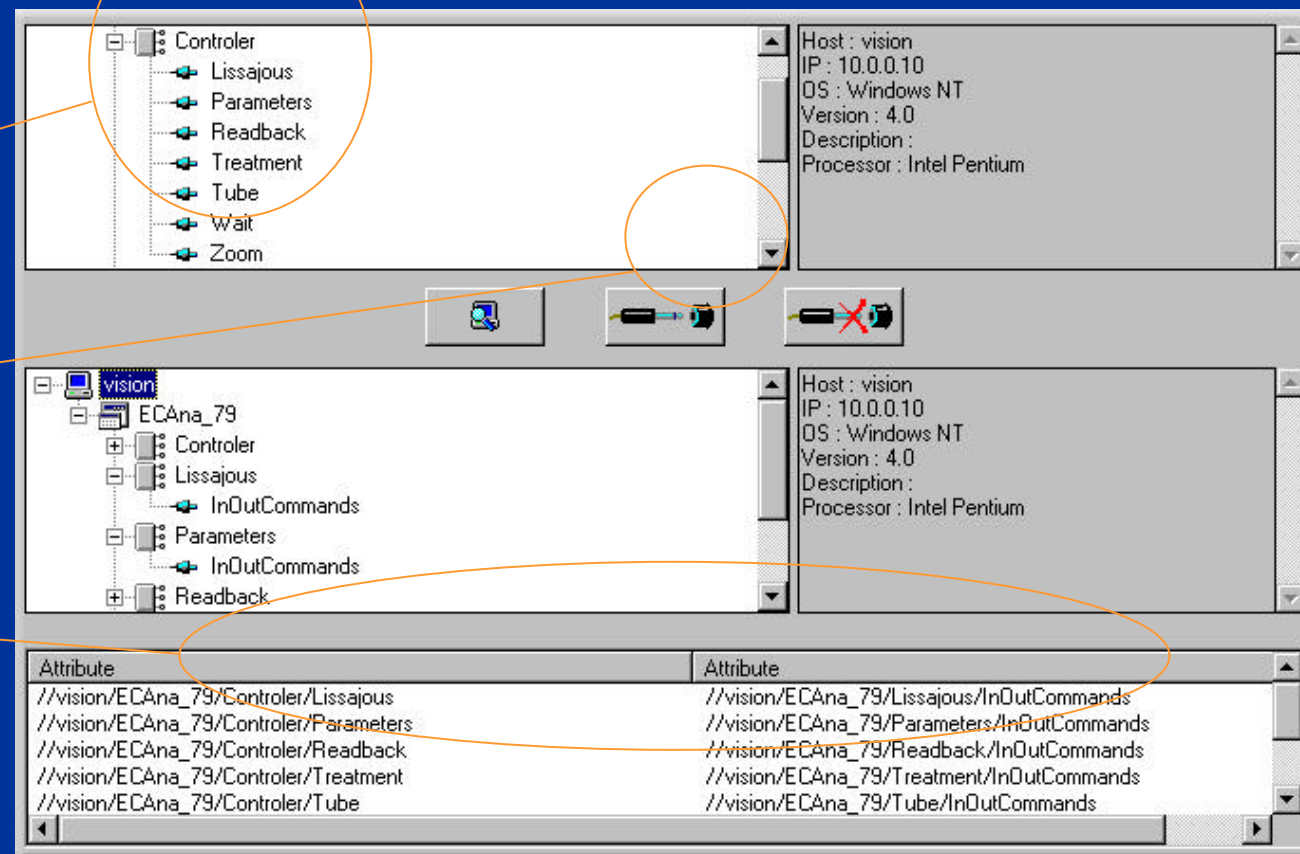- etc.

Plugs Browser

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Components Plugging

Browsing and plugging

Machines
Applications
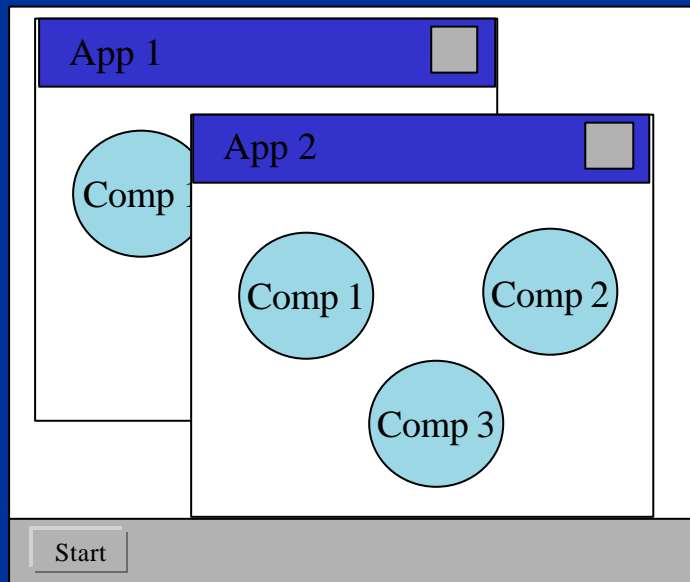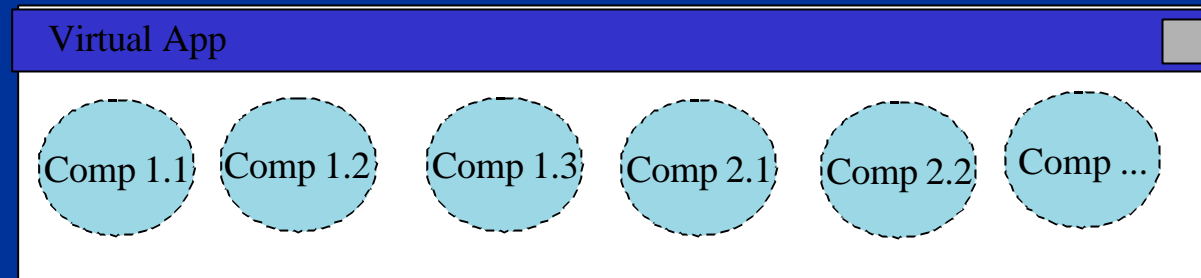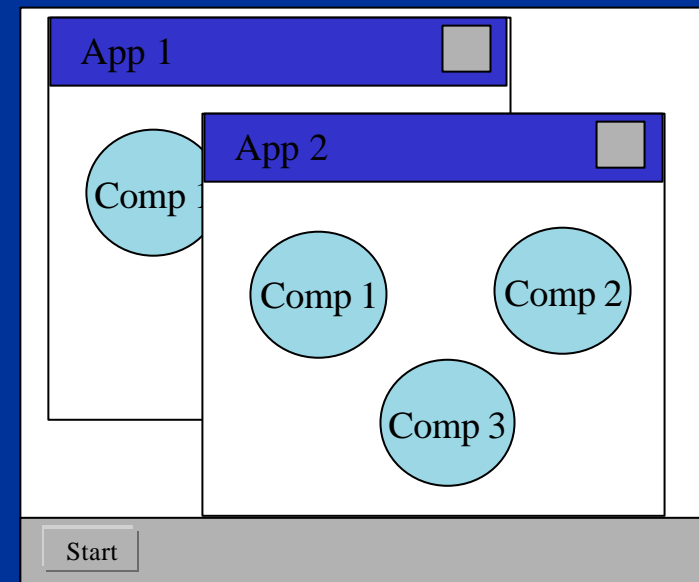Components
and Plugs

Plugging

Active
Connections

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Command and Control Interface

▶ Supervision

  ▶ distributed I/O and data : drivers & networks

  ▶ static et dynamics synoptics

▶ Medium supervision

  ▶ alarms manager

▶ Complex supervision

  ▶ process control (real time)

  ▶ specifics representations

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The Meta-Component Level

Virtual App

Comp 1.1 Comp 1.2 Comp 1.3 Comp 2.1 Comp 2.2 Comp ...

App 1

Comp

App 2

Comp 1 Comp 2

Comp 3

Start

Meta-component

App 1

Comp

App 2

Comp 1 Comp 2

Comp 3

Start

Meta-component

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Interoperable UAV SYSTEM
Ground Segment

With Plug & Net Open Components

- GUI Designer

  Creating the GUIs and Virtualization

- Networks

  Viewing Hardware Agents as Components

  Accessing data and I/O as plugs

- Process Manager

  Interoperability of process control

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More informations

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